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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,799	06/26/2001	Aleksander J. Pyzik	60942A	1474

109 7590 01/05/2004  
THE DOW CHEMICAL COMPANY  
INTELLECTUAL PROPERTY SECTION  
P. O. BOX 1967  
MIDLAND, MI 48641-1967

EXAMINER

POE, MICHAEL I

ART UNIT PAPER NUMBER

1732

DATE MAILED: 01/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/891,799

Applicant(s)

PYZIK ET AL.

Examiner

Michael I Poe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2-4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
    - I. Claims 1-17, drawn to a reinforcing fiber, classified in class 428, subclass 294.7.
    - II. Claims 13-18, drawn to a concrete article, classified in class 52, subclass 740.1.
    - III. Claims 19-24, drawn to a method for preparing a concrete article, classified in class 264, subclass 333.
  2. The inventions are distinct, each from the other because of the following reasons:
  3. Inventions of Group I and Group II are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product (MPEP § 806.04(b), 3rd paragraph), and the species are patentably distinct (MPEP § 806.04(h)). In the instant case, the intermediate product is deemed to be useful as a yarn for making clothing and the like and the inventions are deemed patentably distinct since there is nothing on this record to show them to be obvious variants. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions anticipated by the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.
  4. Inventions of Group III and Group II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process wherein the ends of the fibers are frayed by stretching rather than by mixing with the concrete slurry.
  5. Inventions of Group I and Group III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the
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product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case, the product as claimed can be used in a materially different process of using that product wherein the ends of the fibers are frayed by stretching rather than by mixing with the concrete slurry.

6. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

7. During a telephone conversation with applicant's attorney Kevin Nilsen on June 18, 2002, a provisional election was made with traverse to prosecute the invention of Group III, claims 19-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

8. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Specification***

9. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 112***

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 includes the recitation "the reinforcing fiber is comprised of at least two filaments bonded together and comprised of a polymer core, at least partially enveloped by a polymeric sheath". This recitation is confusing to one reading the claims because it is unclear whether the filaments have a sheath-core structure or the reinforcing fiber has a sheath-core structure. For the purpose of this Office action, the examiner has assumed, based on the non-elected claims, that each of the filaments has a sheath-core structure and that the reinforcing fiber is a yarn comprising a bundle of two or more filaments.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 19, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,414,030 (Restrepo) in view of Japanese Patent Publication No. 06-122821 A (Martinus et al.) and U.S. Patent No. 4,552,805 (Fish, Jr. et al.).

**Claim 19**

Restrepo teaches a method of making fiber-reinforced cement boards (a method for preparing a concrete article) including forming a mortar by mixing mortar components and fibrous material in a mixer such that the mechanical shredding action of the mixing operation causes the fibrils of the fibrous material to become further fibrillated or refibrillated (mixing concrete, water and a reinforcing fiber for a sufficient time to fray the reinforcing fibers); and molding the mortar by means of extrusion, injection molding,

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casting, centrifugal molding or by means of a combination of the aforementioned molding methods; and curing the molded mortar to form a reinforced microfibrillated structure having fibrous material randomly oriented through the hardened matrix (curing the mixture to form the concrete article) (claims 6-8; column 3, line 55 - column 4, line 22; column 6, line 25-34).

Restrepo does not specifically teach that the reinforcing fibers are frayed at one or both of their ends during the mixing operation. However, Martinus et al. teach a method of manufacturing molded good including mixing a staple fiber and a bulking agent such as a mineral, kaolin, stone, quartz, inorganic fiber or the like in a mixer such that the mixer transmits higher shearing force to the mixture to thereby form two or more fibrils on the ends of the fibers (mixing for a sufficient time to fray an end or ends of the reinforcing fibers) (paragraphs 4-7 of the machine translation of Martinus et al.). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to significantly fibrillate the ends of the reinforcing fibers during the mixing operation in the process of Restrepo as taught by Martinus et al. to provide a cement board having ultra high strength due to the fibrillated ends interlocking with the matrix of the mortar components.

Although Restrepo in view of Martinus et al. teach the basic claimed process, Restrepo in view of Martinus et al. does not specifically teach that an end or ends of at least 50% of the fibers are frayed or fibrillated. Although this limitation is not explicitly taught by Martinus et al. and therefore by the combination of Restrepo in view of Martinus et al., the examiner stipulates that one of ordinary skill in the art would have obviously recognized, when taking the teachings of Martinus et al. and Restrepo as a whole, that the majority (e.g., at least 50%) of the fibers in the modified process of Restrepo in view of Martinus et al. would have been fibrillated at their ends. Further, Fish, Jr. et al. teach a method of forming composites reinforced with high strength aramid fibers having fibrillated ends including feeding a yarn or tow of continuous p-aramid filaments or fibers into a tensioning zone; tensioning the filaments or fibers almost to their breaking points; and randomly breaking the tensioned filaments or fibers by sharply deflecting them laterally with interdigitating mechanical deflectors such that preferably 70 to 80% of the filaments or fibers have fibrillated ends and at least 50% of the fibrillated stretch broken filaments or fibers

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have 5-20 fibrils per end (fraying an end or ends of at least 50 percent of the reinforcing fibers) (column 1, line 56 - column 2, line 36). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to fibrillate at the ends of 70 to 80% of the fibers in the process of Restrepo in view of Martinus et al. as taught by Fish, Jr. et al. to provide a cement board free of wrinkling (see specifically column 1, lines 27-39 of Fish, Jr. et al.).

#### **Claims 23 and 24**

The discussion of Restrepo, Martinus et al. and Fish, Jr. et al. as applied to claim 19 above applies herein.

Restrepo in view of Martinus et al. and Fish, Jr. et al. does not specifically teach that the surface area of the fibers after mixing is at most about 3 or ten times the surface area of the fibers prior to mixing. In this regard, the examiner stipulates that the degree of fibrillation is directly proportional to the surface area of the fiber. Thus, the surface area of the fibers after mixing would inherently be greater than the surface area of the fibers prior to mixing in the process of Restrepo in view of Martinus et al. and Fish, Jr. et al. due to the increased degree of fibrillation created by the mixing operation. Further, as recognized by Fish, Jr. et al., the degree of fibrillation is a result-effective variable. As such, one of ordinary skill in the art would have obviously determined the optimal degree of fibrillation, and therefore the optimal surface area ratio, in the process of Restrepo in view of Martinus et al. and Fish, Jr. et al. through routine experimentation based upon the components of the cement slurry, the desired end use of the cement product, etc.

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,414,030 (Restrepo) in view of Japanese Patent Publication No. 06-122821 A (Martinus et al.), U.S. Patent No. 4,552,805 (Fish, Jr. et al.) and U.S. Patent No. 5,861,213 (Ohmory et al.).

#### **Claim 20**

The discussion of Restrepo, Martinus et al. and Fish, Jr. et al. as applied to claim 19 above applies herein.

Restrepo in view of Martinus et al. and Fish, Jr. et al. does not specifically teach that the reinforcing fiber is a yarn comprised of at least two filaments bonded together and has a sheath-core

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structure as set forth in claim 20. However, Ohmory et al. teach a fibrillatable fiber of a sea-islands structure for use as a reinforcing material for fiber-reinforced cement products comprising a yarn formed of a plurality of filaments (the reinforcing fiber is comprised of at least two filaments bonded together) having a polyvinyl alcohol sea component surrounding a plurality of polyacrylonitrile island components (comprised of a polymeric core, at least partially enveloped by a polymeric sheath comprised of a fusing-fraying polymer) which can be fibrillated by the shear force of mixing (column 1, lines 6-15; column 2, lines 38-62; column 3, lines 10-44; column 3, line 63 - column 4, line 10; column 9, line 64 - column 10, line 9; column 10, lines 29-35). Note that polyvinyl alcohol (e.g., the polymeric sheath) has a melting temperature lower than polyacrylonitrile (e.g., the polymeric core). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to use a fibrillatable fiber having a sea-islands structure in the process of Restrepo in view of Martinus et al. and Restrepo as taught by Ohmory et al. to provide a reinforcing fiber having a higher adhesivity to cement and a higher thermal resistance (see specifically column 3, lines 10-22 of Ohmory et al.).

15. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,414,030 (Restrepo) in view of Japanese Patent Publication No. 06-122821 A (Martinus et al.), U.S. Patent No. 4,552,805 (Fish, Jr. et al.) and U.S. Patent No. 5,380,477 (Kent et al.).

**Claims 20 and 21**

The discussion of Restrepo, Martinus et al. and Fish, Jr. et al. as applied to claim 19 above applies herein.

Restrepo in view of Martinus et al. and Fish, Jr. et al. does not specifically teach that the reinforcing fiber is a yarn comprised of at least two filaments bonded together and has a sheath-core structure as set forth in claims 20 and 21. However, Kent et al. teach a multicomponent yarn comprising filaments of a sheath-core structure (the reinforcing fiber is comprised of at least two filaments bonded together) having a thermoplastic matrix component of a first melting point if crystalline or a first softening point if not crystalline as the sheath (at least partially enveloped by a polymeric sheath comprised of a fusing-fraying polymer) and a drawable, oriented, fibrous thermoplastic reinforcing component of a second melting point if crystalline or a second softening point if not crystalline as the core (comprised of a

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polymeric core) wherein the first melting or softening point is at least 5°C below the second melting point (that has a lower melting temperature than the polymeric core) (abstract; column 1, lines 13-26; column 3, line 64 - column 4, line 12). Kent et al. further teach that the matrix component and the reinforcing component may comprise polyolefins such as polypropylene, polyethylene, polytetrafluoroethylene and polyphenylene ether (the reinforcing fiber is comprised of a polypropylene core polymer, at least partially enveloped by a sheath comprised of a fusing/fraying polymer selected from the group consisting of low density polyethylene, maleic anhydride grafted low density polyethylene, ethylene-styrene copolymer, polyethylene having a melt index of from about 5 to about 35 and a density of from about 0.9 gram per cc to about 0.965 gram per cc, ethylene acrylic copolymer and combinations thereof) (column 4, line 39 - column 5, line 34). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to a multicomponent yarn as the reinforcing fiber in the process of Restrepo in view of Martinus et al. and Fish, Jr. et al. as taught by Kent et al. to provide fiber having a stronger intermolecular adhesion and thereby providing a stronger cement product (see specifically column 3, lines 37-51 of Kent et al.).

16. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,414,030 (Restrepo) in view of Japanese Patent Publication No. 06-122821 A (Martinus et al.), U.S. Patent No. 4,552,805 (Fish, Jr. et al.), U.S. Patent No. 5,380,477 (Kent et al.), and U.S. Patent No. 5,224,774 (Valle et al.).

**Claim 22**

The discussion of Restrepo, Martinus et al., Fish, Jr. et al. and Kent et al. as applied to claim 21 above applies herein.

Restrepo in view of Martinus et al., Fish, Jr. et al. and Kent et al. does not specifically teach that the reinforcing fiber is in a paper bag when added to the mix and that the fibers completely disperse uniformly into the mix within about a mixing time of about 5 minutes. However, Valle et al. teach a method of using a concrete additive product including placing a closed paper package containing an effective amount of fibers directly into fresh concrete (the reinforcing fiber is in a paper bag when added to the mix) and mixing the fresh concrete in a batch type concrete mixer for sufficient time to cause the

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packaging material to disintegrate and dispense the fibers uniformly throughout the fresh concrete wherein the mixing time should be at least about 5 minutes (the fibers completely disperse uniformly into the mix with about a mixing time of about 5 minutes) (column 2, lines 37-45; column 4, lines 15-21). It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made and one of ordinary skill would have been motivated to mix the fibers into the cement slurry by placing a closed paper package containing the fibers into the slurry and mixing the slurry to disintegrate the paper package in the process of Restrepo in view of Martinus et al., Fish, Jr. et al., and Kent et al. as taught by Valle et al. to provide a method of mixing the fibers into the cement slurry that was easier to administer (see specifically column 1, lines 27-45 of Valle et al.).

### **Conclusion**

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 4,261,754 (Krenchel et al.), U.S. Patent No. 4,929,502 (Giglia), U.S. Patent No. 5,788,908 (Murakami) and PCT Publication No. WO 01/64599 A1 (Stangl) have been cited of interest to show the state of the art at the time the invention was made.

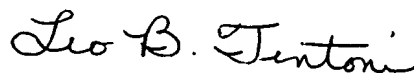
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael I Poe whose telephone number is (571) 272-1207. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1234.



Michael Poe/mip



LEO B. TENTONI  
PRIMARY EXAMINER  
ART UNIT 10732